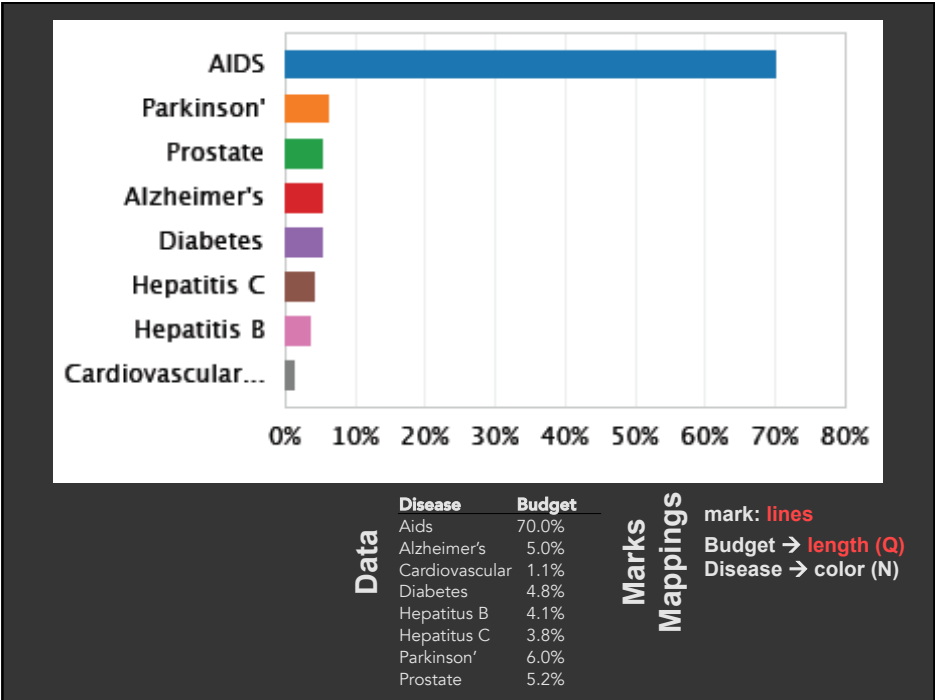
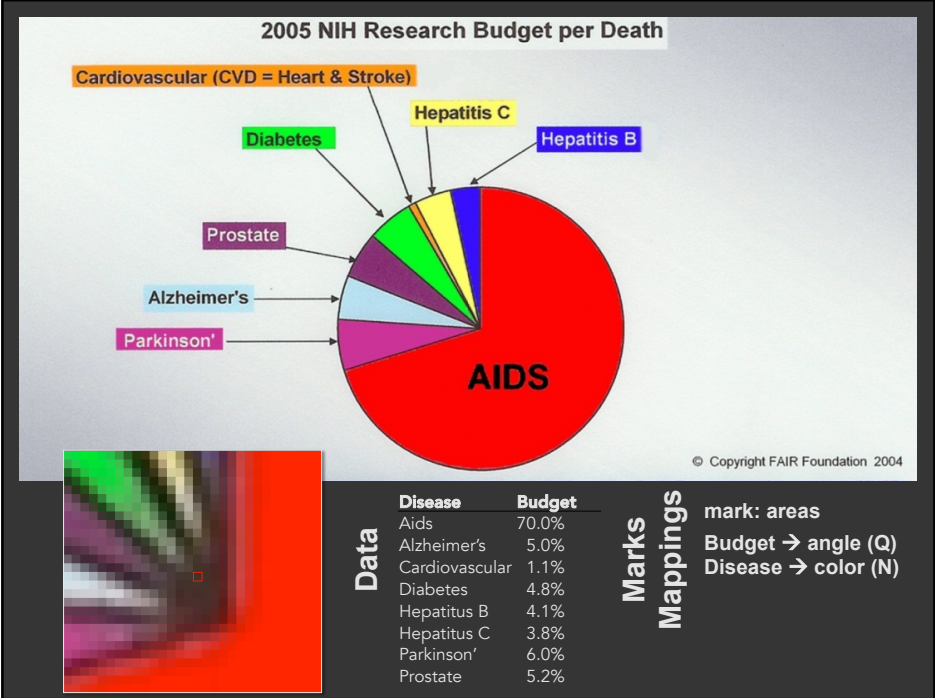


Collaborative Visual Analysis

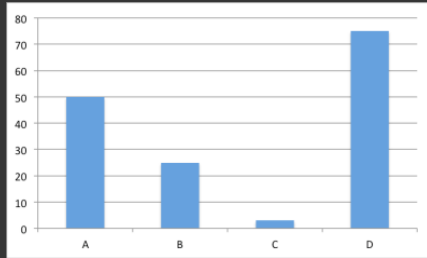
Maneesh Agrawala

CS 448B: Visualization
Spring 2016

**Last Time: Deconstructing
Visualizations**



Bar Charts



marks: lines

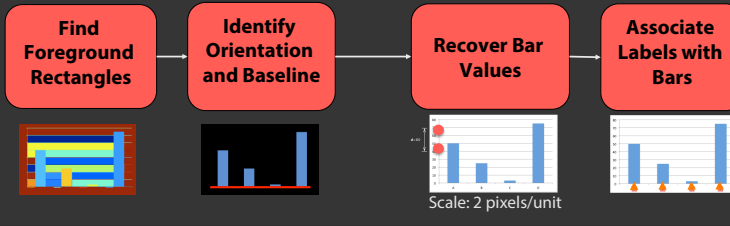


y-value x-value

50	A
35	B
4	C
75	D

Extract Marks

Extract Data



Interactive Documents

How can we facilitate reading text and charts together?

Syrian refugees: how many are there and where are they?

The humanitarian fallout of the conflict in Syria reaches new proportions as the number of estimated refugees reaches one million

- Download the data
- More data journalism and data visualisations from the Guardian

Mona Chalabi & Simon Rogers
theguardian.com, Wednesday 6 March 2013 13:03 GMT
Jump to comments (0)

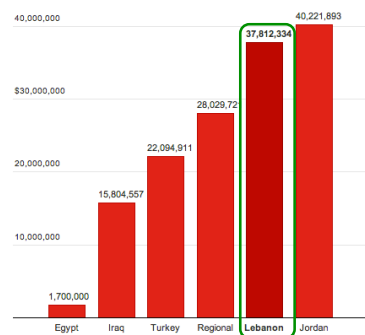
Share (2)
Tweet (0)
Stumble (0)
Share (0)
Email

Article history

Some contributions are made on a regional basis, but many donors prefer to contribute to efforts in a specific country. In line with the distribution of the refugees themselves, most funds are funnelled towards Jordan (28%), followed by Lebanon (26%), Turkey (15%) and Iraq (11%).

Where the money goes

Where the international community has donated to help Syria's refugees



SOURCE: UNHCR
SET THE DATA EMBED FULLSCREEN

theguardian

Announcements

Final project

Design new visualization method (e.g. software)

- Pose problem, Implement creative solution
- Design studies/evaluations less common but also possible (talk to us)

Deliverables

- Implementation of solution
- 6-8 page paper in format of conference paper submission
- Project progress presentations

Schedule

- Project proposal: 5/11
- Project progress presentation: 5/23 in class (3-4 min) slide presentation
- Final poster presentation: 6/3 12:15-3:15pm Location: TBD
- Final paper: 6/5 11:59pm

Grading

- Groups of up to 3 people, graded individually
- Clearly report responsibilities of each member

In-Class Project Presentations

Dates: 5/23 In class presentation: 3 min per group

- Description of problem you are addressing
- Relevant prior work, how your work is different
- Description/storyboard and of approach
- A list of milestones for finishing the project by the deadline

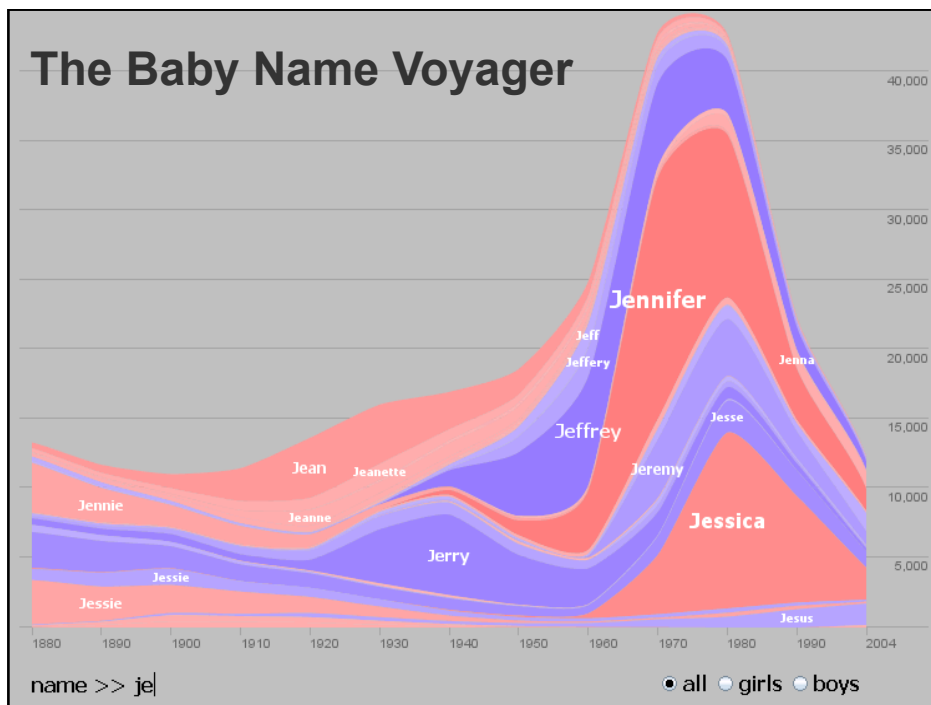
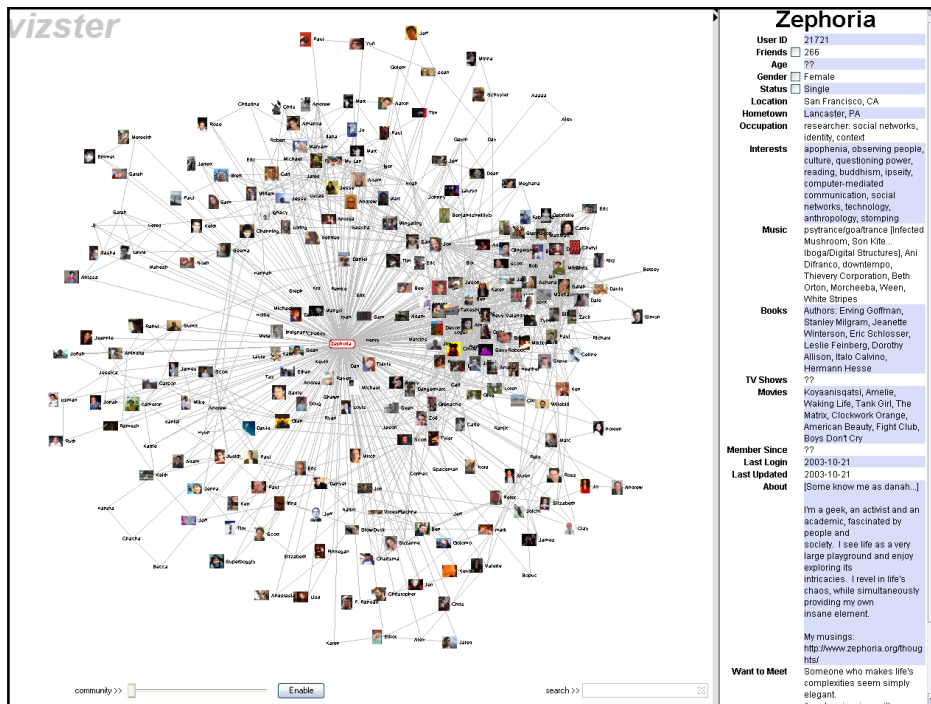
Scheduling

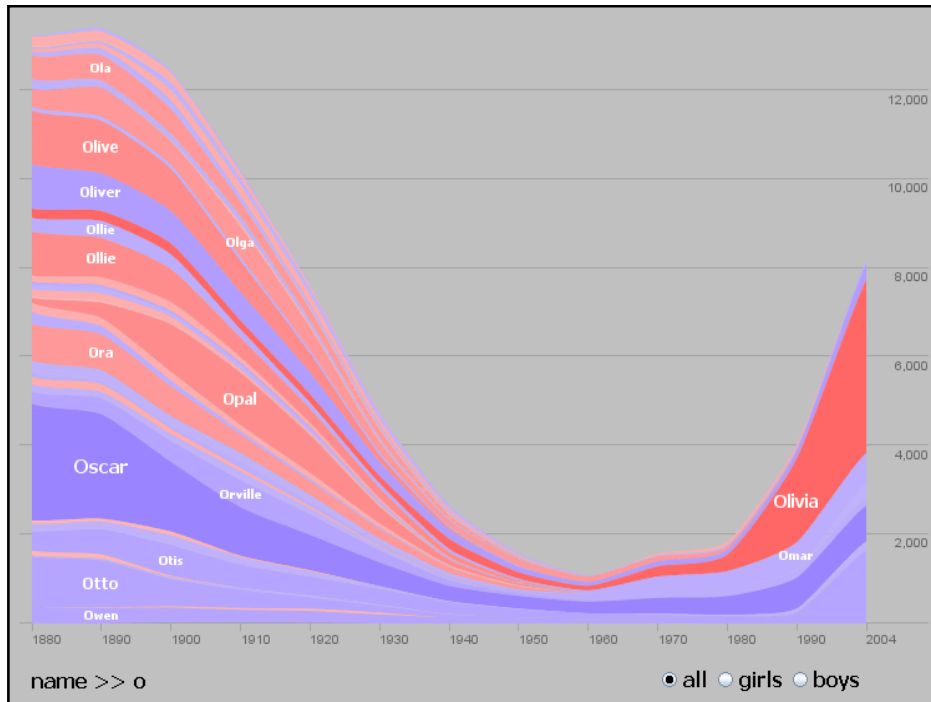
- **Slides due 10am on 5/23** (make sure you can finish in 3 min)
- Will split projects for 5/23 into two groups of 20 projects
- One group will present here, one in **TBD**
- All others should post feedback on piazza

Afterwards should post on the wiki

- Review of relevant prior work with full references
- List of milestones (scope your project appropriately)

A Tale of Two Visualizations





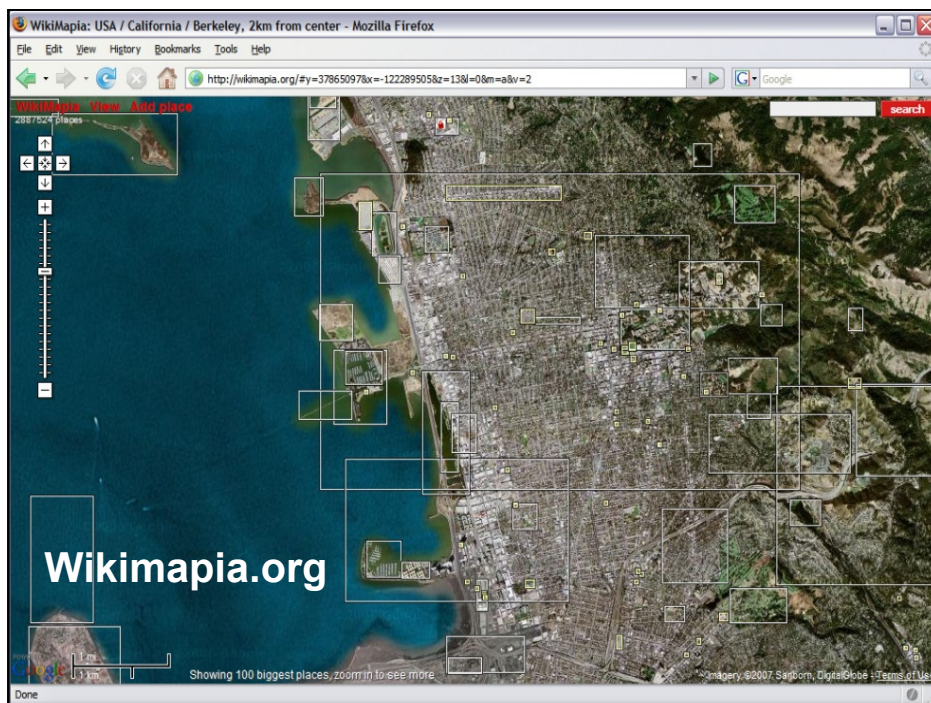
Social Data Analysis

Visual sensemaking can be **social** as well as cognitive

Analysis of data coupled with **social interpretation and deliberation**

How can user interfaces catalyze and support **collaborative visual analysis?**

Social Data Analysis



The screenshot displays the Spotfire DecisionSite Posters interface. It features several data visualizations:

- Share change over regions and territories:** A stacked bar chart showing values ranging from -3,000,000 to 3,000,000 across four regions: NW, NE, SE, and WE.
- Class change vs share change:** A scatter plot with 'Share change' on the x-axis and 'Class change' on the y-axis, showing a dense cluster of data points.
- Share change over regions and territories (smaller):** A smaller version of the stacked bar chart located in the bottom right.
- Class change vs share change (smaller):** A smaller version of the scatter plot located in the bottom right.
- Query Editor:** A panel on the right side showing a query for 'Sales overview - December' with filters for 'Sales quadrant' and 'Include empty values'.
- Message Panel:** A notification at the bottom right stating: 'A new DecisionSite Poster, Sales overview - December, has been published to the DecisionSite Library. Click Open to login to the full Spotfire DecisionSite Poster!'.

Spotfire Decision Site Posters

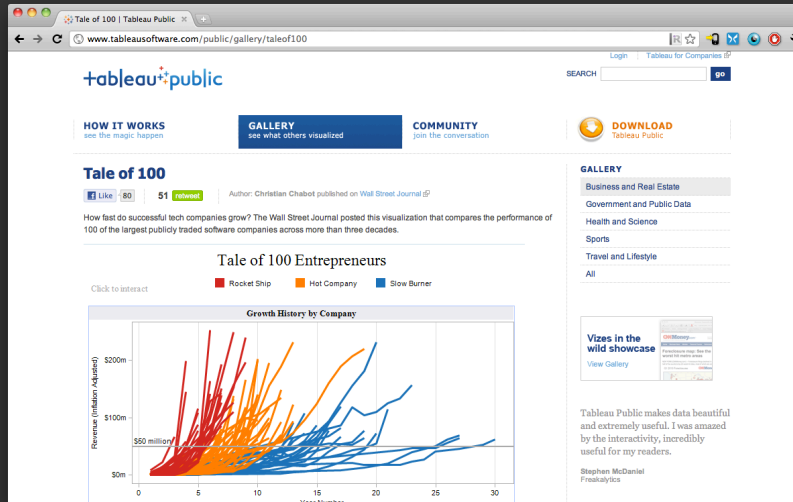
The screenshot shows the IBM Many Eyes website interface. It includes a navigation menu on the left with sections for 'Explore', 'Participate', and 'Learn more'. The main content area is titled 'Try our featured visualizations' and displays six different data visualizations:

- Top 10 Oil Producing Nations:** A world map showing oil production by country, created by 'avannk'.
- Select Crime Stats in Lafayette, LA:** A line graph showing crime statistics from 1999 to 2011, created by 'rxr'.
- US Brewed Malted Beer Exports:** A stacked area chart showing beer exports from 2008 to 2012, created by 'crossborders1'.
- Global Distribution of Leatherback Turtle:** A pie chart showing the distribution of an endangered species, created by 'Anonymous'.
- Cosmetic Procedures:** A bubble chart showing cosmetic procedures in 2012, created by 'KatieCreative'.
- Salaries by Undergraduate Major:** A scatter plot showing starting and mid-career salaries by major, created by 'dsbx'.

Many-Eyes
[Viégas, Wattenberg, et al. CHI 07]

Try out the newest version of IBM Many Eyes! [Try ManyEyes v2 >](#)

Tableau Public



Where can Collaborators Contribute?

Data Management

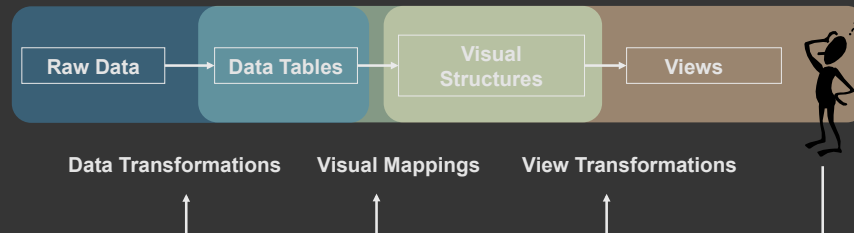
Contribute Data
Clean Data
Categorize Data
Moderate Data
Create Metadata

Visualization

Select Data Sources
Apply Visual Encoding
Author Software

Visual Analytics

Observations
Hypotheses
Evidence (+/-)
Summarize
Report / Presentation



Design Considerations

[Heer & Agrawala VAST 07, IVS 08]

- 1. Division, allocation, and integration of work**
- 2. Common ground and awareness**
- 3. Reference and deixis (pointing)**
- 4. Identity, trust, and reputation**
- 5. Group formation and management**
- 6. Incentives and engagement**
- 8. Presentation and decision-making**

**Sense.us: Collaborative
Visualization of Demographic Data**

sense.us > social data visualization - Mozilla Firefox

http://sense.us/

Log in to add comments! IBM e-mail pass login help

Dogear Tags
Dogear Tag Usage, May 2005 to August 2006
source: IBM Dogear
10 comments

Dogear People
Dogear Bookmarking by Person, May 2005 to August 2006
source: IBM Dogear
1 comment

Job Voyager
Reported Occupations of U.S. Labor Force, 1850-2000
source: <http://ipums.org>
139 comments

Birthplace Voyager
Reported Birthplace of U.S. Residents, 1850-2000
source: <http://ipums.org>
10 comments

sense.us - social data visualization

sense.us is a prototype system for collaborative visualization.

- See the data. See what people have to say about it.
- Dive into the data and share your explorations.

The site requires **Java 1.5+** and either **Firefox** or **Internet Explorer**. Use your **IBM W3/BluePages e-mail and password** to login. Use at least **1024x768** resolution for the best experience.

Check out the **user's guide** and **privacy policy** before getting started.

Having problems using Firefox with Java 1.4? Some users using Firefox and Java 1.4 have found that comments aren't loading properly. If you run into this problem, consider upgrading to Java 1.5 (**Windows, Linux**) or using Internet Explorer (on Windows systems). Sorry for any inconvenience!

U.S. Census State Map
State Map of 2000-2005 Census Data
source: U.S. Census Bureau
16 comments

Population Pyramid
U.S. Population Demographics, 1850-2000
source: <http://ipums.org>
7 comments

Done

[Heer, Viégas, Wattenberg CHI 07]

Exploratory Design Rationale

Sharing within visualization and across the web

http://sense.us/jobs#scale=1&gender=All&query=mili

Reported Occupations of U.S. Labor Force, 1850-2000 (source: <http://ipums.org>)

>> mili all men women % of Work Force

comments (5) New Comment | View All (143)

Is this military info right?

I would have expected a different pattern for the military, but then again made this is just the military industrial complex growing and growing.

by **Martin Sharp** on Fri Jul 21, 2006 10:15 AM

here are labels where I would have expected big jumps.

by **Martin Sharp** on Fri Jul 21, 2006 10:16 AM

well, there was also the cold war right after ww2, which might be part of the reason why there's such a huge jump after the 40s. It is also interesting that there is such a drop between the 70s and the 80s.

by **Julia Hernandez** on Fri Jul 21, 2006 11:01 AM

I guess a lot of it has turned to robots, and the industrial complex, as martin suggested, though it would be interesting to see the comparison of the fall in military personnel next to the rise in COO funding for robots and industry.

by **Jesse O'Brien** on Fri Jul 21, 2006 11:51 AM

I think the jumps have more to do with the economy at large rather than any particular military conflict. Lots of money in conflict has already been spent before the conflict starts.

by **Fred Klein** on Wed Aug 2, 2006 10:24 AM

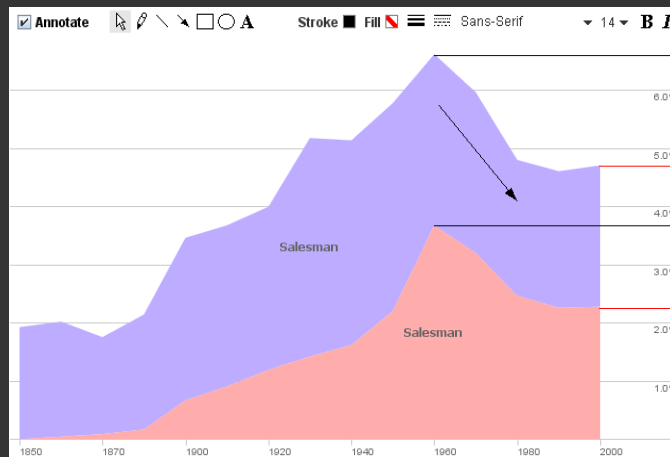
reply

bookmarks (1) Add View | Save | Load | View All

Exploratory Design Rationale

Sharing within visualization and across the web

Pointing at interesting trends, outliers

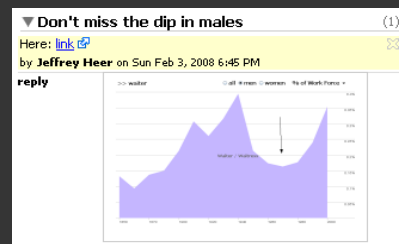
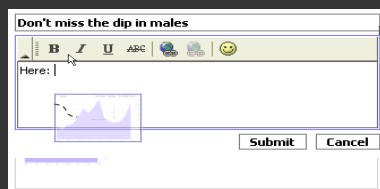


Exploratory Design Rationale

Sharing within visualization and across the web

Pointing at interesting trends, outliers

Collecting and linking related views



Exploratory Design Rationale

Sharing within visualization and across the web

Pointing at interesting trends, outliers

Collecting and linking related views

Awareness of social activity

Ushers?
Is this like the movie theatre kind of usher?
by **Martin Sharp** on Fri Jul 21, 2006 10:24 AM

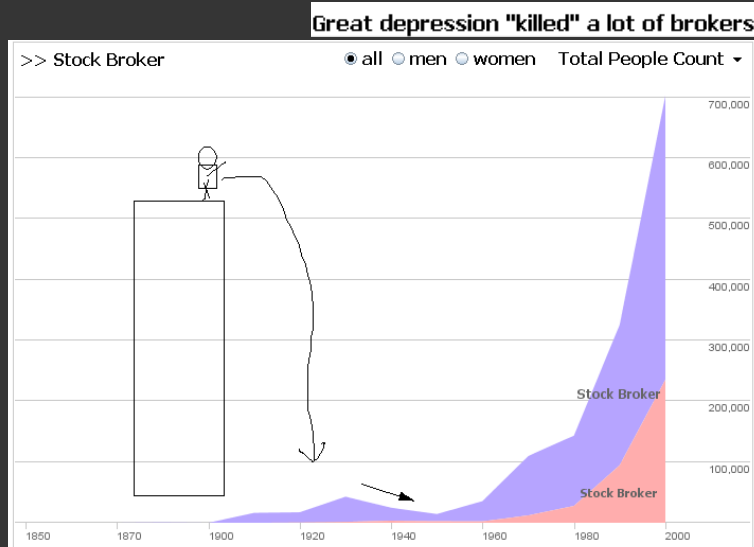
Drop in household workers
This trend is almost the opposite of the "clerical worker" and "secretary" categories. It's amazing how much it drops.
by **Julia Hernandez** on Fri Jul 21, 2006 10:50 AM

Disappearing professors???
Note how a bunch of different kinds of professors "disappear" in the year 2000, whereas the "professor" category take off.
Is this just a change in the way the census aggregates data?
by **Julia Hernandez** on Fri Jul 21, 2006 11:07 AM

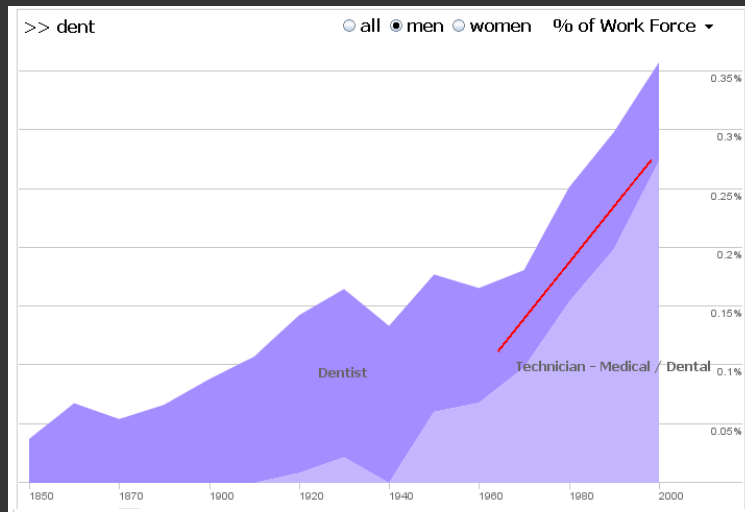
Building Off of Others



Data Jokes



Collaborative Sensemaking



Sharing in External Media

The screenshot shows the dogear website interface. At the top, there's a navigation bar with 'All Active | My Bookmarks | My Subscriptions' and a search bar containing 'sense.us'. Below the search bar, a list of search results is displayed, each with a title, a small thumbnail image, and a brief description. The results include items like 'sense.us > dogear_tags', 'sense.us > social data visualization', 'Asian-born as % of U.S. population: sense.us visualization', 'Art trumps science in dogear?', 'sense.us > dogear_people', 'Ask, Texans', 'sense.us > dogear_tags: sometime', 'sense.us > birthplace: regionm&is', and 'African immigration'. Each result also shows the date of the item and the user who created it.

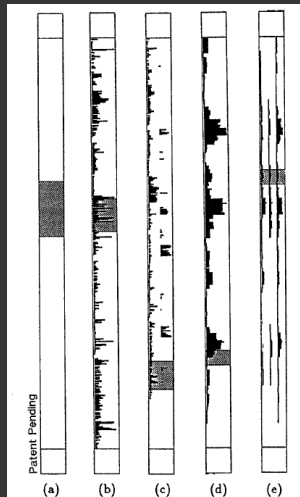
This screenshot shows another view of the dogear website search results for 'sense.us'. The layout is similar to the first screenshot, but the list of results is different. Visible results include 'African immigration', 'School & Poverty', 'sense.us > dogear_tags', 'Visualization of people on dogear', 'sense.us > dogear_tags: [ct] sometime?', '"personal" usage of dogear decreasing?', 'Children and household size', 'The one shrinking state of the union', and 'Florida was obvious, but the others?'. Each result includes a title, a thumbnail, a description, a date, and a user name.

Designing for Social Data Analysis

Social Data Analysis

How can users' activity traces be used to improve awareness in collaborative analysis?

Social Navigation



Read & Edit Wear, Hill et al 1992

del.icio.us / jheer /

your bookmarks | your network | subscriptions | links for you | post

All your items (189)

< earlier | later > page 1 of 19

2005 MicroGraph Winners [edit / delete](#)
to visualization photography science ... [saved by 5 other people](#) ... on sept 20

NEJM -- The Spread of Obesity in a Large Social Network over 32 Years [edit / delete](#)
to health networks research science social visualization psychology ... [saved by 30 other people](#) ... on sept 06

PetersProjection-over gif (GIF Image, 1203x800 pixels) [edit / delete](#)
to maps visualization ... [saved by 3 other people](#) ... on aug 30

Forbes Lists, World's Richest People, and more - Forbes.com [edit / delete](#)
to business data economics reference statistics ... [saved by 202 other people](#) ... on aug 25

Well-formed data | Elastic lists | Nobel prize winners demo [edit / delete](#)
to visualization vizzgalerie infovis flash sparklines design ... [saved by 518 other people](#) ... on aug 24

Data Visualization: Modern Approaches | Graphics [edit / delete](#)
to visualization web community infovis vizzgalerie design ... [saved by 10 other people](#) ... on aug 24

Christian Cantrell: ActionScript PNG and JPEG Encoders Updated [edit / delete](#)
... [saved by 14 other people](#) ... on aug 24

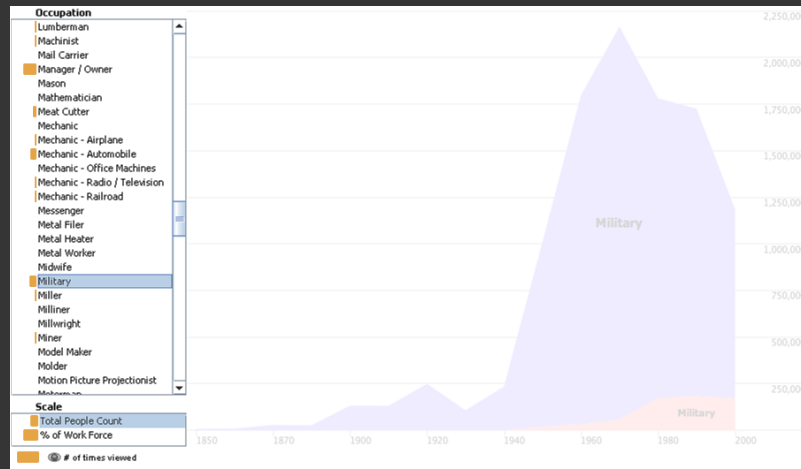
Acrobats [edit / delete](#)
to flash fun interaction animation ... [saved by 61 other people](#) ... on aug 23

Wikinvest | The Investing Wiki with Research about Companies, Investment Concepts, and more [edit / delete](#)
to collaboration web wiki reference finance economics business analysis visualization ... [saved by 12 other people](#) ... on aug 23

Los Angeles Times Homicide Map [edit / delete](#)
to maps statistics visualization infovis interaction news data ... [saved by 63 other people](#) ... on aug 14

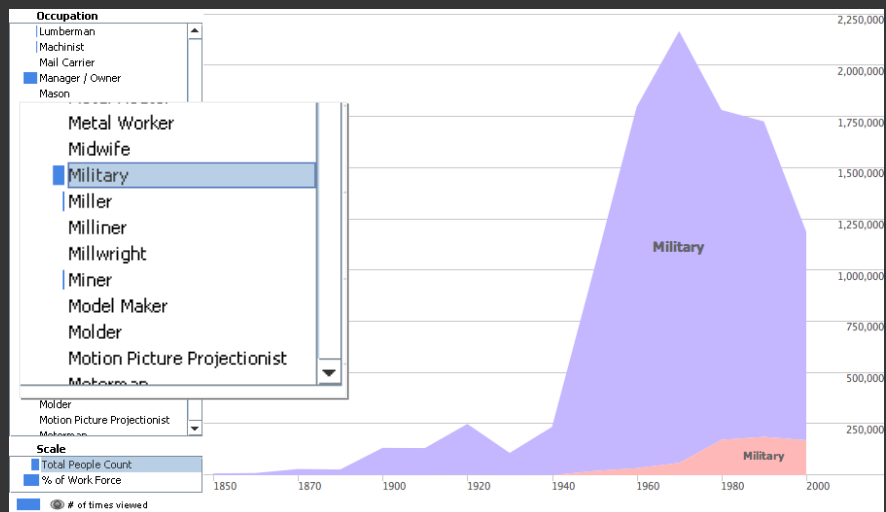
< earlier | later > page 1 of 19

Scented Widgets [InfoVis 07]

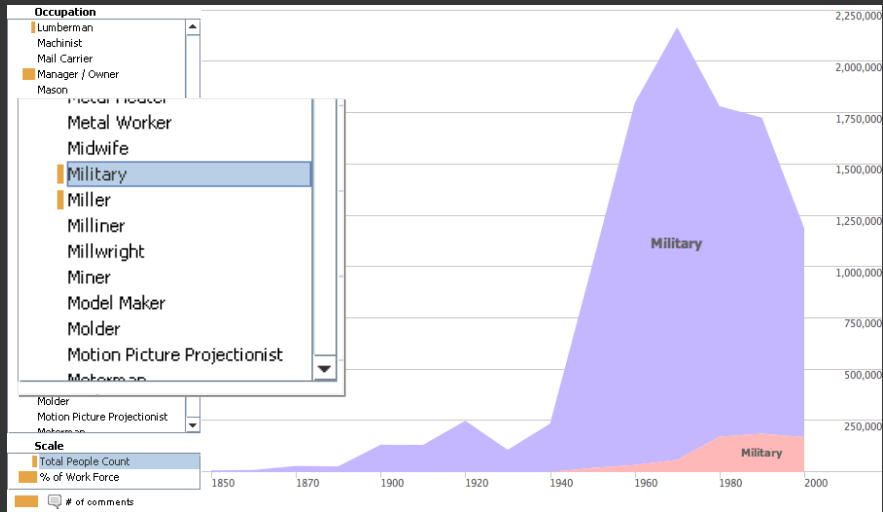


Visual navigation cues embedded in interface widgets

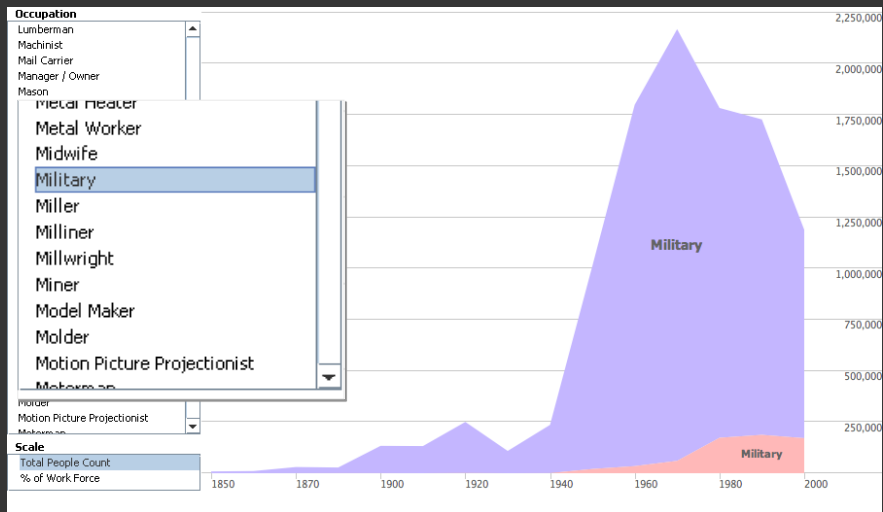
Visitation counts



Comment counts



No scent (baseline)



Do activity cues affect usage?

Hypotheses: With activity cues, subjects will

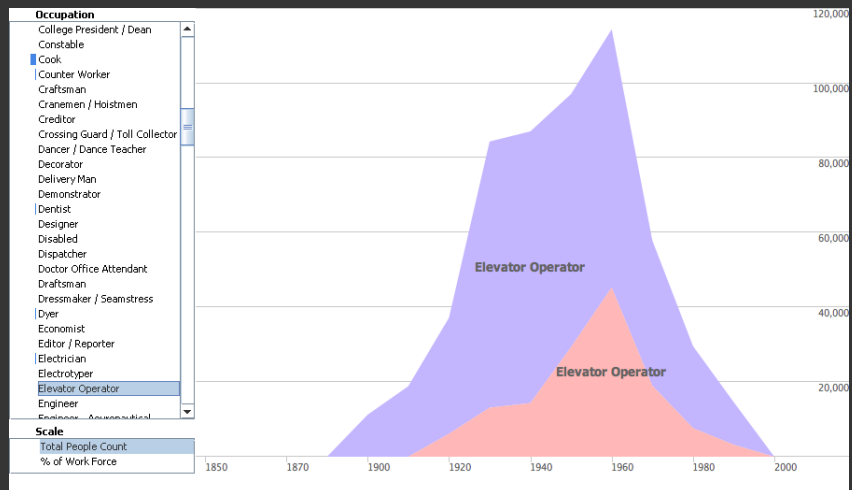
1. Exhibit more revisitation of popular views
2. Make more unique observations

Controlled experiment with 28 subjects

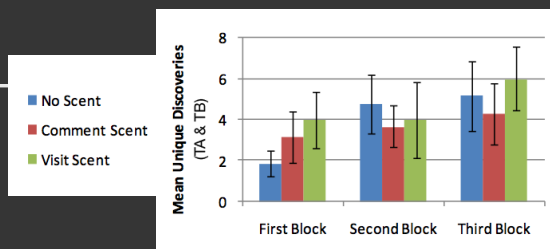
Collect evidence for and against an assertion

Varied scent cues (3) and foraging task (3)

“Technology is costing jobs by making occupations obsolete.”



Results



Unique Discoveries

Visit scent had sig. higher rate of discoveries in first block
Less reliance on scent when subjects were familiar with data and visualization

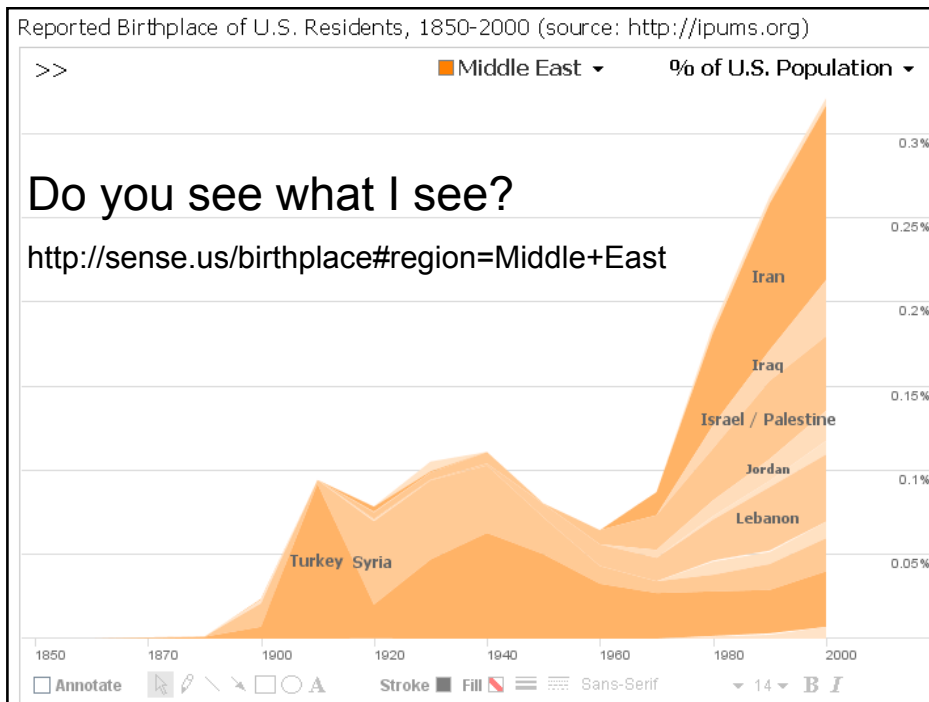
Revisitation

Visit and comment scent conditions correlate more highly with seed usage than no scent

Social Data Analysis

How can users' activity traces be used to improve collaborative analysis?

How should annotation techniques be designed to provide nuanced pointing behaviors?



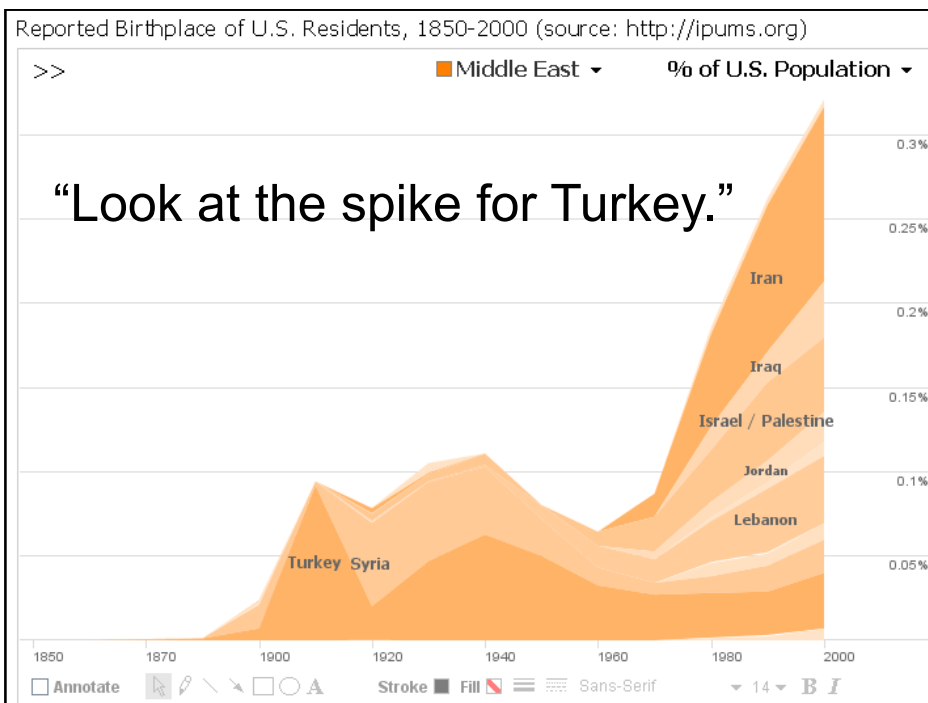
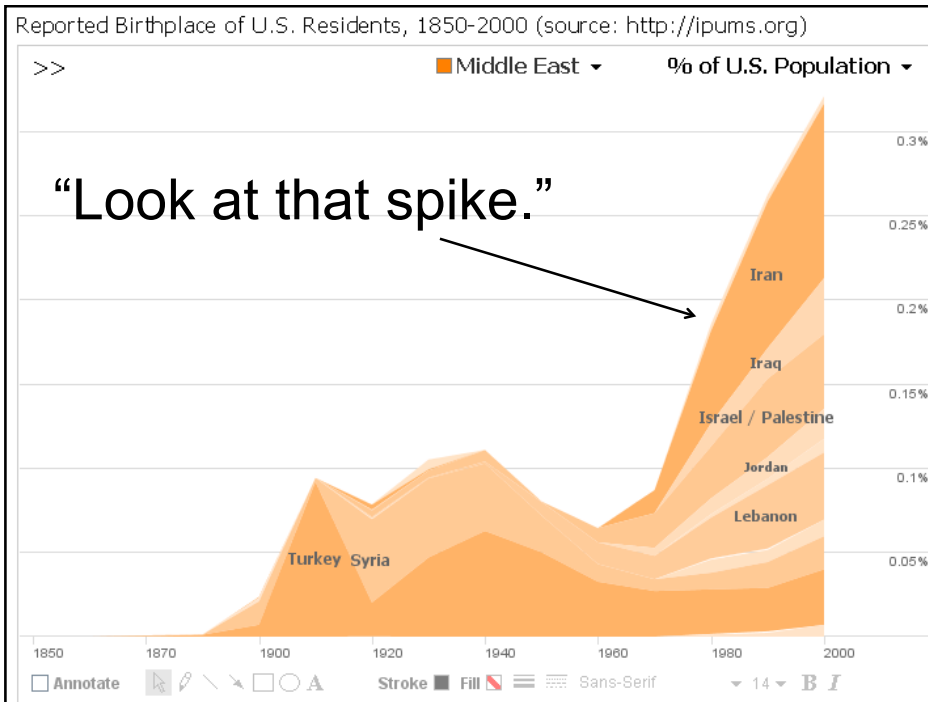
Common Ground

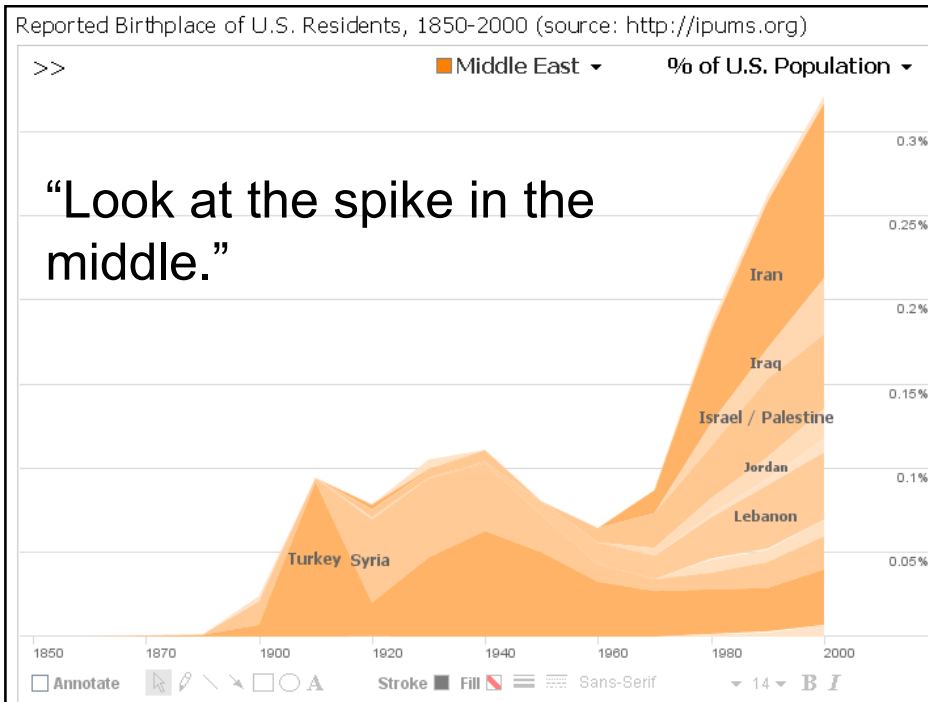
The shared understanding enabling conversation and collaborative action [Clark & Brennan '91]

Do you see what I see? → View sharing (URLs)

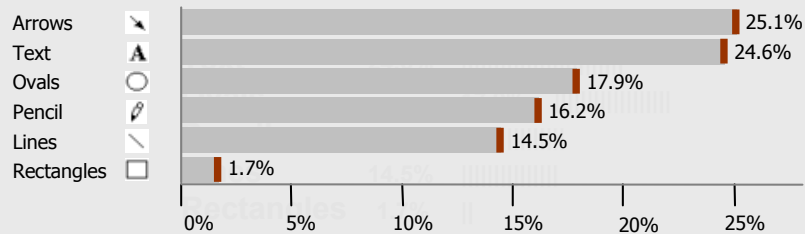
Principle of Least Collaborative Effort: participants exert *just enough* effort to successfully communicate

[Clark & Wilkes-Gibbs '86]





Use of Annotations



39.0% of comments included annotations

Pointing to specific points, trends, or regions (88.6%)

Drawing to socialize or tell jokes (11.4%)

Variety of subject responses

‘Not always necessary’, but ‘surprisingly satisfying’

Some concern about professional look

Many-Eyes: Social Data Analysis at an Internet Scale

The screenshot shows the IBM Many Eyes website interface. At the top, the browser address bar displays `www-958.ibm.com/software/analytics/manyeyes/`. The page header includes the "Many Eyes" logo, a "Log in" link, and the IBM logo. A navigation menu on the left lists sections: "Explore" (Visualizations, Data sets, Comments, Topic centers), "Participate" (Create a visualization, Upload a data set, Create a topic center, Register), and "Learn more" (Quick start, Visualization types, About Many Eyes, Privacy, Blog). The main content area is titled "Try our featured visualizations" and displays six data visualizations:

- Top 10 Oil Producing Nations**: A world map showing oil production by country, created by `evannk`.
- Select Crime Stats in Lafayette, LA**: A line chart showing crime statistics from 1999 to 2011, created by `rxr`.
- US Brewed Malted Beer Exports**: A stacked area chart showing beer exports from 2008 to 2012, created by `crossborders1`.
- Global Distribution of Leatherback Turtle**: A pie chart showing the distribution of leatherback turtles, created by `Anonymous`.
- Cosmetic Procedures**: A bubble chart showing cosmetic procedures in 2012, created by `KatieCreative`.
- Salaries by Undergraduate Major**: A scatter plot showing starting and mid-career salaries by major, created by `dsbx`.

At the bottom of the page, there is a footer with the text "Try out the newest version of IBM Many Eyes!" and a link to "Try ManyEyes v2".

Templates for Visualizing Data

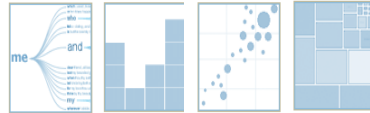
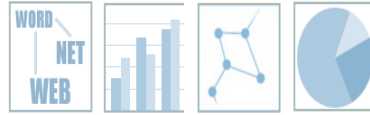
Create a visualization in three easy steps

- 1 CHOOSE A DATA SET
- 2 CHOOSE A VISUALIZATION
- 3 CUSTOMIZE & PUBLISH

First things first. Choose the data set that you would like to visualize.

Then choose the kind of visualization you would like to use.

Customize what your visualization will look like when others visit. Then publish it.

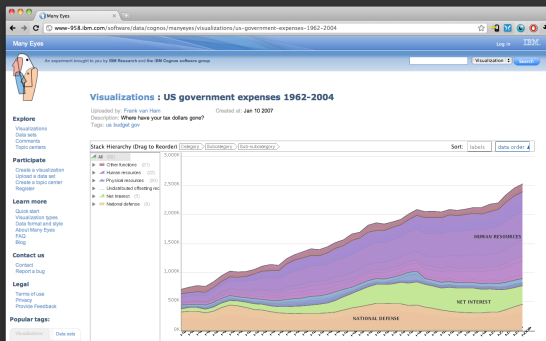


Start with a data set

You have two choices:

- use one of the [existing data sets](#) on the site, or
- [Upload your own data set](#)

Commenting



US government expenses 1962-2004
 Martin Waterberg says:
 Veterans benefits are going down, percentage-wise.
 Posted Jan 11 2007
[See view for the comment](#)

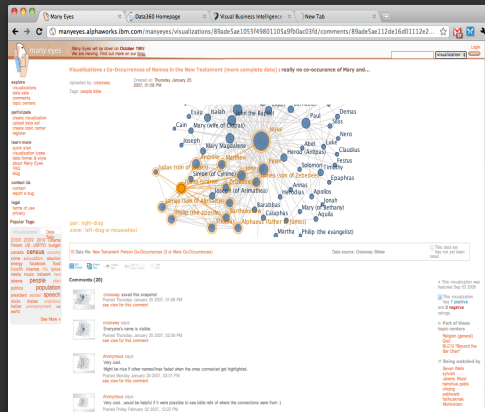
US government expenses 1962-2004
 Anonymous says:
 Health care costs exploded in 1990, and then just kept rising. (Compare veterans benefit hospitals, which grew steadily.)
 Posted Jan 23 2007
[See view for the comment](#)

US government expenses 1962-2004
 Anonymous says:
 Spaceflight funding peaks long before the Apollo landings and never recovers. (Guess someone didn't spin that "one small step" well enough?)
 Posted Jan 23 2007
[See view for the comment](#)

US government expenses 1962-2004
 Josh Peters says:
 Re: Spaceflight funding. Had the Soviet Union continued its space expansion to the extent that seemed to compete with the USA's, you can bet our spending would have skyrocketed.
 Posted Jan 23 2007
[See view for the comment](#)

US government expenses 1962-2004
 Anonymous says:
 The national defense expenses in 1968 and 2004 are roughly equal, but the difference in percentage is enormous. Once wonder if this leads to less resentment for spending money?
 Posted Jan 23 2007
[See view for the comment](#)

Outside Communities



ESV ENGLISH STANDARD VERSION® BIBLE

Visualizations: Co-Occurrences of Names in the New Testament

The visualization of Many Eyes lets you pan and zoom around to your heart's content. (You need the Java plugin for your browser to be able to interact with the visualization.)

The `get_all` behind the visualization isn't perfect, while it distinguishes people with the same name (like the apostle and John the Baptist), for example, it only tracks co-occurrences in the same chapter. In other words, just because two people appear in the text near each other, that doesn't mean they have a relationship. So you have to keep the old Testament commandment to "thou shalt not kill" in your mind when interpreting the visualization.

It's a great tool and may help you make some useful insights. This data set only includes three or more co-occurrences. We also updated a complete list of co-occurrences in the New Testament, but the data isn't broken the visualization software at the moment. And there are so many nodes that it isn't that useful. But feel free to play with `get_all` and come up with interesting visualizations of your own.

We'll keep you with a [complete list of co-occurrences](#).

Year	Incidents	Fatalities
February 2006	0	0
March 2006	0	0
April 2006	0	0
May 2006	0	0
June 2006	0	0
July 2006	0	0
August 2006	0	0
September 2006	0	0
October 2006	0	0
November 2006	0	0
December 2006	0	0
January 2007	0	0

Swivel.com

Home Graphs Data People Groups Upload

The Status of George Bush's War on Terrorism

By [seema](#) on Feb 22, 2007
Viewed 8527 times

Graph Table Cloud Map Absolute Relative All 31v 21v 4v More Options

Legend

- Global Terrorist Incidents, 1968-2007
- Incidents
- Injuries
- Fatalities

Tags

no tags yet

Community Tags [Add tags](#)

no tags yet

Correlations [See all](#)

99% Incidents and Fatalities

Related Graphs

- Yearly Terrorism Statistics Created By: [Dmitry](#) Views: 2474
- Global Terrorism Incidents and Iraq Body Count Created By: [Dmitry](#) Views: 1866
- Reported Maximum vs. The Status of George Bush's War on Terrorism Created By: [qust](#) Views: 1192
- Reported Maximum vs. The Status of George Bush's War on Terrorism Created By: [qust](#) Views: 1192

Sources: MIFT Terrorism Knowledge Base (<http://www.terrorismknowledgebase.com>)

Incidents, injuries, and deaths from terrorism have increased during the new millennium. This may be because of the broader definition of what characterizes a terrorist act, or it may actually be a constant increase in such acts. — [seema](#)

Comments (12)

Anonymous says
Go BUSH!
posted 11 months ago

Tyler says
What a completely disingenuous graph, and comments to follow. You have absolutely no reason to think the line would stay flat without Bush.
You probably thought graphs like these (and your site more widely) would help people overcome preconceived notions by showing hard data. Instead, you're just amplifying people's preconceived notions -- adding legitimacy

Share this Graph

- Send an Email
- Post to Blog
- 11 diggs
- Rate It
- 0 ratings
- Sign in to rate
- Like It
- Feature It

Swivel.com, and others...

A graveyard of “YouTubes for Data”



Emergent analysis and discussion isn't very good

Visualizations : Domestic Net Migration 2004-2008
Uploaded by: Anonymous Created at: Sunday March 07 2010, 08:38 PM
Description:
Tags: states united ce

Domestic Net Migration

Search>>
Color

Anonymous says:
Very impressive blog. I will share it with my friends as well.
Posted Monday October 11 2010, 02:02 AM
[see view for this comment](#)

neshvox says:
Thanks for the link to this resource.
[hardtail pants](#) | [mikimoto necklace](#)
Posted Friday April 16 2010, 02:00 PM
[see view for this comment](#)

Many Eyes – circa 4/2012

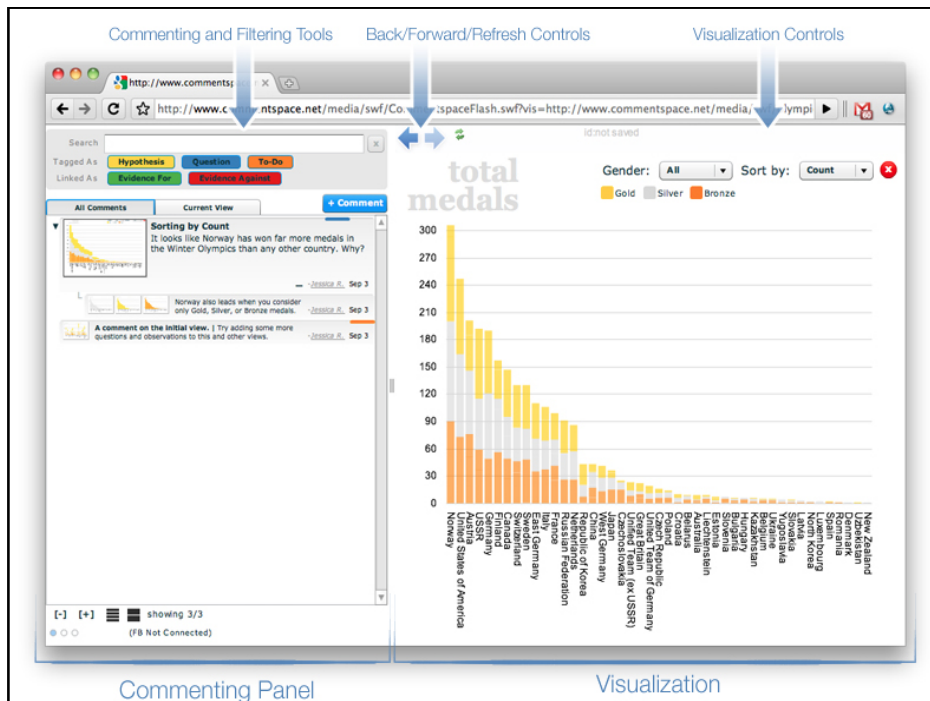
128,478 Visualizations

17,340 Comments

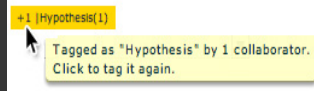
only ~11% of comments provided a plausible hypothesis or explanation for the data in the chart

CommentSpace: Structured Support for Social Data Analysis

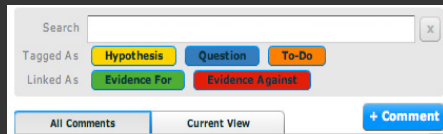
Can we augment social data analysis to support deeper analysis and synthesis?



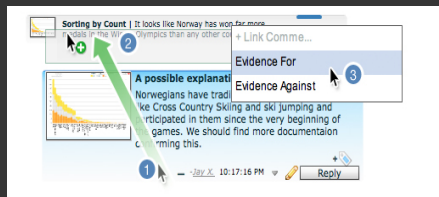
Hypothesis generation/evidence gathering



Contributors highlight important items with tags



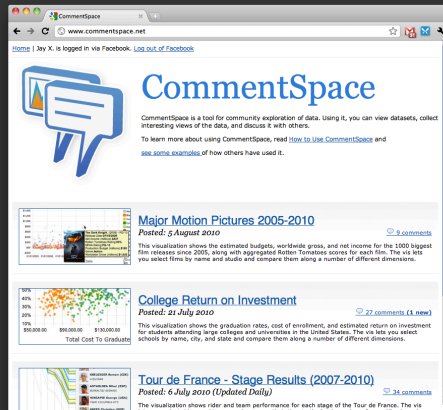
Tags help late-joiners identify and build on important comments



Contributors use links to organize contributions and build narrative



Studies and Deployments



Controlled lab studies to test core analysis subtasks

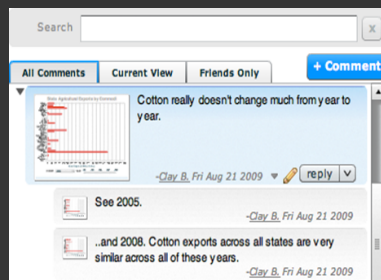
Live deployments (www.commentspace.net)

Study: Use of Tags and Links

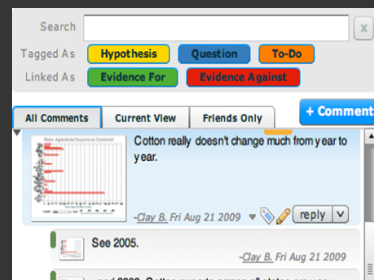
Hypothesis: Tags and links can provide common ground and encourage continued discussion.

A between subjects study (n=24) with 2 conditions.

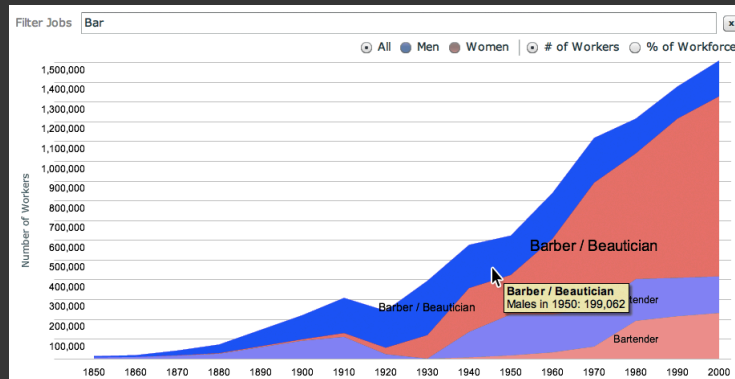
"No-Tag" Condition



"Tag" Condition



Study: Prompt



Hypothesis: Stereotypically male jobs have remained almost entirely male even as women have joined the work force.

Study: Results








Participants who used tags and links classified comments more **consistently** and **accurately** than those who didn't

(greater in-group agreement) (greater agreement with experts)

Participants using tags and links generated significantly more replies to existing comments

Tag (Median=7)
No-Tag (Median=2)

But

	Justin Timberlake has had one #1 single.	-AnalystC3 Wed Sep 2 2009
	Strange pattern.	-AnalystE5 Wed Sep 2 2009
	Come with me if you want to live!	-AnalystE5 Wed Sep 2 2009
	When Tweens attack.	-AnalystE5 Wed Sep 2 2009
	Mariah Carey's "I'll Be There" is a #1 hit single.	-AnalystC3 Wed Sep 2 2009
	I like Rainforest better than 19, but I guess more people liked the anti-war thing with 19.	-AnalystD4 Wed Sep 2 2009
	There's just no love for jazz, is there?	-AnalystD4 Wed Sep 2 2009

In open-ended tasks, participants still engaged mostly in superficial, exploratory analysis

We saw very little use of tags or links

The Impact of Social Information on Visual Judgments

Can having access to social information be harmful to analysis?

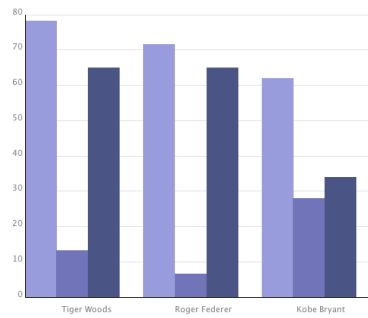
Visualizations : Highest Paid Athletes of 2013 3 VARIABLES

Uploaded by: Dewant
Description:
Tags: athletes

Created at: Dec 26 2013

Legend
Click to select.
Ctrl-Click: multiple
Shift-Click: range

Pay
Salary/Winnin
Endorsements



Can evidence of others' graphical judgments (accurate or not) impact subsequent users' judgments?

Comments

Currently showing

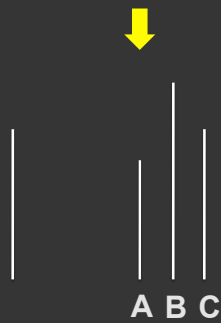


Highest Paid Athletes of 2013 3 VARIABLES

Woods and Federer are equal in endorsements. Bryant barely gets half as many.

Posted: Dec 26 2013
See view for this comment

Social Influence



Asch 1951

Social Influence

Normative versus Informational

Using social signals as evidence when we're choosing:

- Restaurants
- Music (Salganik et al. 2009)
- Tags (Golder et al. 2007)

Controlled Experiment

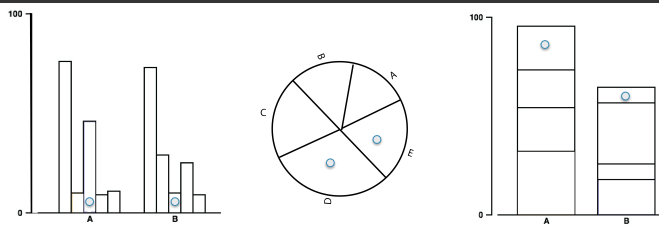
Interested in impact on accuracy of graphical judgments (given task where subjects are incentivized to be correct)

Two conditions:

Non-social: Visual judgment task with no social information

Social: Same task, presented with summary of judgments from non-social group

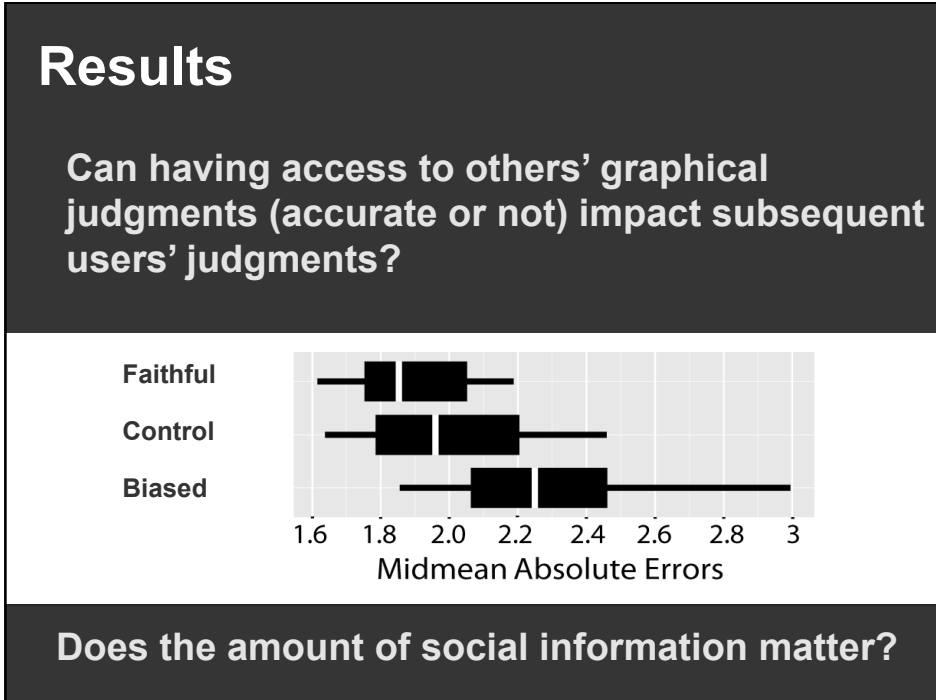
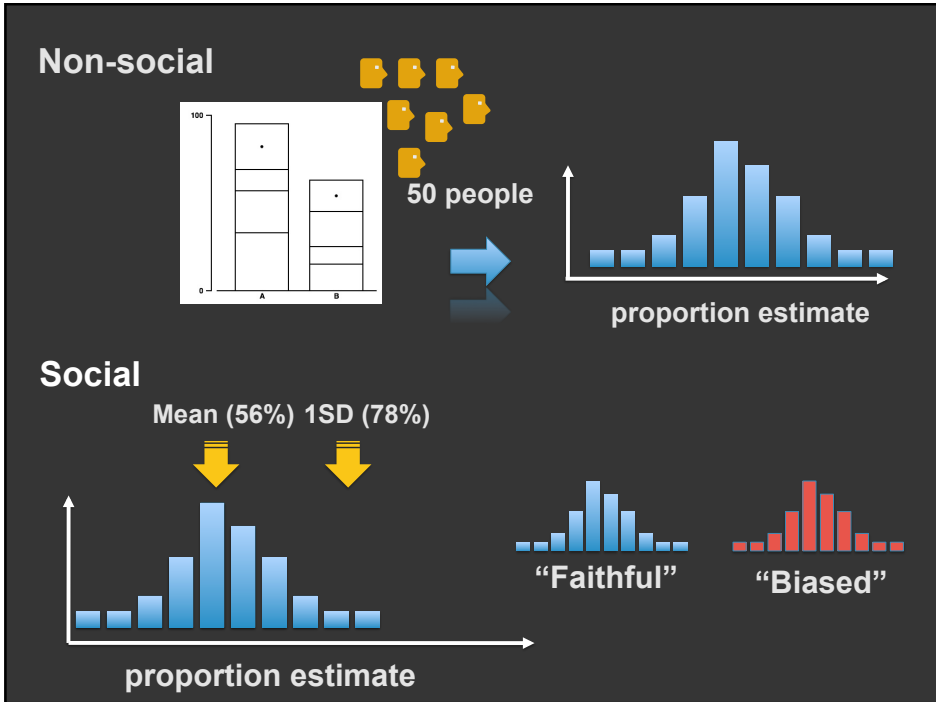
Visual judgment task



Cleveland & McGill 1984

1. Which of the two marked sections is larger?
2. Make a quick visual judgment of what proportion the smaller section is of the larger.

AMT study: Heer & Bostock 2010



Summary

Data analysis is usually a collaborative process

Supporting collaboration between strangers is difficult

Desire to fit in can influence analyst when working in a collaborative setting